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Influence of large wood on channel hydraulics, sediment (dis-)connectivity and channel morphology in a medium-sized mixed-load Austrian stream

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It is widely known that large wood (LW) in rivers alters channel hydraulics, channel morphology and sediment transport. Channel spanning LW can create blocking barriers, steps and dams which store sediment and organic material in small reservoirs for the lifetime of the damming structure. Otherwise, the breach of LW key logs and jams makes the long term stored sediment available for fluvial transport. However, detailed field measurements on the distribution of LW and its influence on hydraulic variables, channel morphology and (especially) sediment connectivity are still rare, thus further constituting the major aim of this study. The study was performed along the lower reaches (∼6 km) of the Fugnitz River, a mixed-load, medium-sized (catchment area ∼ 130 km^2) single-thread perennial stream, located in the Bohemian Massif, Austria. The spatial distribution and characterization of LW (>1 m in length and >10 cm in diameter) was examined along the main stem via field mapping and dGPS measurements. Hydraulic channel parameters (e.g. channel gradient, cross-sectional profiles) and volumes of retained sediment were determined via field measurements, while channel morphology incl. indications of LW-induced geomorphic processes (e.g. bank undercutting, scouring) was obtained via geomorphic mapping. Flow characteristics and bed load transport rates were measured using an Ott-Nautilus and a portable Helley-Smith bed load sampler during different water stages. Additionally, bed sediment textures were examined by performing pebble count analyses. In-channel LW accumulations (total volume of ∼588 m^3) were primarily observed in meandering river reaches as well as in reaches with steep hillslopes. 36% of all LW accumulations were classified as dams, steps or deflectors altering flow conditions or creating backwater areas decreasing sediment connectivity. Highest volumes of sediment storage (total volume of ∼26 m^3) have been primarily recorded at locations where bank erosion processes and local sediment inputs to the channel system have been observed.